

REMARKS

Claims 1, 3 and 5-22 are pending in the present application.

Claims 2 and 4 have been cancelled.

Claims 10-22 have been withdrawn from consideration as being drawn to nonelected subject matter.

I. Moriyama et al. (US Pregrant Publication No. 2001/0005742) and Nakagawa et al. (JP 02-269709)

Claims 1, 4 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moriyama et al. in view of Nakagawa et al. Applicants respectfully traverse the rejection.

In order to highlight certain teachings of Nakagawa et al., Applicants enclose herewith an English translation of portions thereof.

It is submitted that there is no suggestion or motivation to combine Moriyama et al with Nakagawa et al, and further that the benefit of the present invention is surprising and unexpected from Moriyama et al and Nakagawa et al.

I - A. Moriyama et al

First, with regard to the Examiner's reference (page 3, lines 4-7 and lines 19-22 of the Office Action) to the butenedioic acid monoalkyl ester-copolymerized acrylic elastomer disclosed in Moriyama et al, the Examiner will note that the content of 0.1-30% by mole on the basis of carboxyl groups copolymerized in the acrylic elastomer in Moriyama et al. is not the content of butenedioic acid monoalkyl ester units copolymerized therein, but is rather the content of unreacted butenedioic acid monoalkyl ester monomer remaining in the acrylic elastomer (see Abstract; and page 2 [0018] of Moriyama et al.).

The rubbery acrylic elastomer disclosed in Moriyama et al gives a crosslinked product having good vulcanization torque characteristics and good compression set characteristics, and therefore, is useful for gaskets, O-rings, packings, oil seals and various hoses (paragraph [0043]).

I - B. Nakagawa et al

The vinyl chloride copolymer disclosed in Nakagawa et al, which is produced by copolymerization of 99-1% by weight of vinyl chloride monomer with 1-99% by weight of a cycloalkyl fumarate (claim 1), has remarkably improved heat resistance, impact resistance and moldability, as compared with a conventional vinyl chloride resin. More specifically, the heat resistance is evaluated by a softening temperature as measured by JIS K6740, the impact resistance is evaluated by the impact value as measured by JIS K7111, and the moldability is evaluated by the volume rate of flow as measured by using a flow tester (see Example; Table 1).

In view of the above-mentioned beneficial properties, the vinyl chloride copolymer is useful as materials for pipings, valves, automobile parts, window frame, industrial plates, blow-formed bottles, pipes, films and sheets, and electrical parts (page 4, right upper column, lines 7-17; page 4, lines 15-24 of partial translation).

I - C. Combination of Moriyama et al with Nakagawa et al

The vinyl chloride copolymer disclosed in Nakagawa et al is not a rubbery elastomer but a resin, and attains the purpose of improving heat resistance, impact resistance and moldability, as compared with a conventional vinyl chloride resin. These beneficial properties are generally required for resins for molding.

Clearly Moriyama et al and Nakagawa et al are completely nonanalogous art. Any artisan would not be motivated to substitute the "butenedioic acid monoalkyl ester" copolymerized in the acrylic elastomer in Moriyama et al with "fumaric acid cycloalkyl ester" copolymerized in the vinyl chloride copolymer resin in Nakagawa et al.

The Examiner has identified two disparate references which the Examiner alleges contains all of the elements of the instant claims. However, simply showing that all of the elements of the application/patent claim are present in the prior art does not necessarily mean that the invention is obvious. "This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known." *KSR International Co. v. Teleflex Inc.*,

82 USPQ2d 1385, 1389 (U.S. 2007). A reason for the skilled artisan to do what is claimed is part of the obviousness inquiry. Justice Kennedy states: "As is clear from cases such as *Adams* [383 U.S. 39, (1966)], a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art...it can be important to identify a *reason* that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *KSR International Co.* at 1396.

Here, the Examiner states that the artisan would expect improved heat resistance, impact resistance and moldability by incorporating the monocyclohexyl fumarate of Nakagawa et al. into the acrylic rubber of Moriyama et al., see last paragraph of page 4 of the outstanding Office Action. Applicants respectfully disagree. First, the acrylic elastomer of Moriyama et al. is very different in composition and properties from the vinyl chloride polymer of Nakagawa et al. Second, Moriyama et al. are completely silent about the use of vinyl chloride (monomers or polymers) in their composition, and as such, there is no teaching of interchangeability of vinyl chloride and acrylate monomers.

In view of the fact that the compositions of Moriyama et al. and Nakagawa et al. are distinct in properties and structure, the outcome would not be predictable, and as such, the artisan would not have a good reason to pursue the teachings of Nakagawa et al. to modify Moriyama et al. Despite the Examiner's urgings, the artisan would not anticipate success by modifying Moriyama et al. with Nakagawa et al.

In conclusion, the presently claimed invention amounts to a real innovation over the prior art and a *prima facie* case of obviousness cannot be said to exist.

I - D. Unexpected Results

Even assuming *arguendo* that a *prima facie* case of obviousness were to exist, it is further submitted that the benefit of the present invention is surprising and unexpected from Moriyama et al and Nakagawa et al. and as such, the unexpected results would overcome the *prima facie* case of obviousness.

The acrylic rubber of the present invention is characterized as being not scorched at an initial shaping stage, even though a crosslinking agent is incorporated therein, and having reduced permanent set (i.e., compression set).

For example, please compare Example 1 with Comparative Example 1 in Table 2 on page 23 of the present application, and Example 4 with Comparative Examples 2 and 3 in Table 3 on page 26. The acrylic rubber composition described in Example 1 is the same as that described in Comparative Example 1, and that of Example 4 is the same as those in Comparative Examples 2 and 4 except that the acrylic rubbers of Examples 1 and 4 are monocyclohexyl fumarate- or monocyclohexyl maleate- copolymerized acrylic rubber, and those of Comparative Examples 1-3 are mono-n-butyl fumarate- or maleate-copolymerized acrylic rubber. The factual data given in these working examples are summarized as follows.

	Ex. 1	Co. Ex. 1	Ex. 4	Co. Ex. 2	Co. Ex. 3
Acrylic Rubber	A	C	D	E	F
Composition of Acrylic Rubber (wt %)					
Ethyl acrylate	58	58	38	38	38
n-Butyl acrylate	40	40	40	40	40
n-Methoxyethyl acrylate	—	—	20	20	20
Monocyclohexyl fumarate	2	—	—	—	—
Monocyclohexyl maleate	—	—	2	—	—
Mono-n-butyl fumarate	—	2	—	2	—
Mono-n-butyl maleate	—	—	—	—	2
Ingredients in acrylic rubber composition (parts)*1					
Acrylic rubber	100	100	100	100	100
Hexamethylenediamine carbamate	0.5	0.5	—	—	—
4,4'-Diaminodiphenyl ether	—	—	0.5	0.5	0.5
Di-o-tolylguanidine	2	2	2	2	2
Mooney scorch time (65) (min)	6.5	4.5	17.8	10.4	10
Extrusion processability					
Edge			4	3	2
Smoothness			4	2	2
Corner			4	3	3
Dry physical properties					
Tensile strength (MPa)	11.6	11.6	11.2	10.8	10.6
Elongation (%)	240	210	220	200	200
Hardness (JIS A)	65	70	70	71	72
Heat resistance					
Change in elongation (%)	13	14	—5	—8	—14
Change in hardness (%)	1	1	8	8	11
Compression set (%)	13	20	18	18	38
Residual flash*2	0	2	—	—	—
Fluency (scale reading)	4.2	3.46	—	—	—

*1 Each acrylic rubber composition further comprises 60 parts of carbon black, 2 parts stearic acid and 2 parts of 4,4'-bis(α , α -dimethylbenzyl)diphenylamine (antioxidant) (these ingredients are not recited above in the table)

*2 Accumulated frequency of residual flashes at 10 times molding

As seen from the above factual data, the acrylic rubber composition comprising monocyclohexyl fumarate- or monocyclohexyl maleate-copolymerized acrylic rubber according to the present invention exhibits **improved scorch stability** and gives a rubber vulcanizate having **reduced compression set**, as compared with the acrylic rubber composition comprising a mono-n-butyl fumarate- or maleate-copolymerized acrylic rubber (Comparative Examples 1-3).

It would be surprising and unexpected from Moriyama et al that the **improved scorch stability** and the **reduced compression set** of the acrylic rubber composition comprising monocyclohexyl fumarate- or monocyclohexyl maleate-copolymerized acrylic rubber according to the present invention, as compared with the acrylic rubber composition comprising a mono-n-butyl fumarate- or maleate-copolymerized acrylic rubber as described in Moriyama et al.

Nakagawa et al suggests nothing about the improved scorch stability and the reduced compression set of the acrylic rubber composition comprising monocyclohexyl fumarate- or monocyclohexyl maleate-copolymerized acrylic rubber according to the present invention. Therefore, the subject matter of claim 1 and depending claims 3 and 5-9 would not be obvious over the hypothetical combination of Moriyama et al with Nakagawa et al.

Based on the foregoing, significant patentable distinctions exist between the present invention and the teachings of Moriyama et al. and Nakagawa et al. As such, withdrawal of the rejection is respectfully requested.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Conclusion

In view of the above remarks, it is believed that claims are allowable.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq., Reg. No. 43,575 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

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Enclosed : Partial English Translation of Nakagawa et al. (JP 02-269709)